Supporting Information

2-(Arylimino)benzylidene-8-arylimino-5,6,7-trihydroquinoline Cobalt(II) Dichloride Polymerization Catalysts for Polyethylenes with Narrow Polydispersity

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Table of contents Page

Table S1. Crystal data and structure refinement for **Co2** and **Co5**.

	Co2	**Co5**
CCDC number	2160864	2160865
Empirical formula	$C_{58}H_{51}Cl_2CoN_3$	$C_{172}H_{150}Cl_4Co_2N_6$
Formula weight	919.84	2560.63
T (K)	169.99(13)	169.99(13)
Wavelength (Å)	1.54184	1.54184
Crystal system	orthorhombic	monoclinic
Space group	Pbca	$P2_1/c$
a/Å	10.1343(3)	13.6880(2)
b/Å	16.8486(6)	20.8927(2)
c/Å	59.062(2)	52.9277(7)
α/°	90	90
β/°	90	93.9140(10)
γ/°	90	90
Volume/Å^3	10084.8(6)	15100.9(3)
Z	8	4
ϱ_{calc}g/cm^3	1.212	1.126
μ/mm^{-1}	3.938	2.764
F(000)	3848.0	5384.0
Crystal size/mm^3	0.24 × 0.18 × 0.13	0.12 × 0.08 × 0.03
2Θ range for data collection (°)	5.986 to 151.124	4.548 to 151.076
Index ranges	-12 ≤ h ≤ 12 -21 ≤ l ≤ 19 -73 ≤ l ≤ 74	-17 ≤ h ≤ 16 -23 ≤ k ≤ 26 -66 ≤ l ≤ 65
Reflections collected	74898	116664
Independent reflections [R_{int}]	10140(0.0983)	30024(0.0612)
Completeness to θ (%)	99.9	99.8
Goodness of fit on F^2	1.051	1.019
Final R indexes [I >= 2σ(I)]	R_1 = 0.1428	R_1 = 0.0636
Final R indexes (all data)	*w*R_2 = 0.4052 R_1 = 0.1703 *w*R_2 = 0.4257	*w*R_2 = 0.1611 R_1 = 0.0975 *w*R_2 = 0.1812
Largest diff peak/hole (e/Å^{-3})	1.38/-0.65	0.85/-0.50

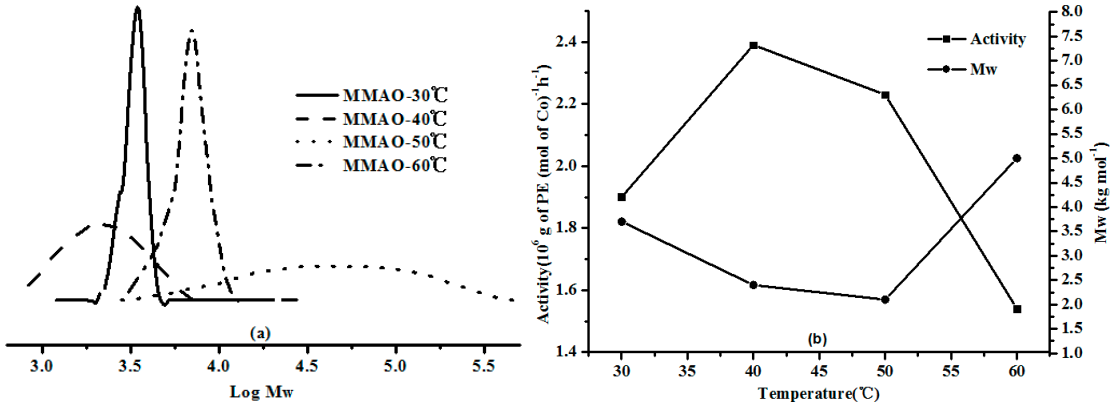

Figure S1. For **Co6**/MMAO: (**a**) GPC traces of the polyethylene obtained at different run temperatures and (**b**) activity and M_w as a function of reaction temperature (entries 1 – 4, Table 4).

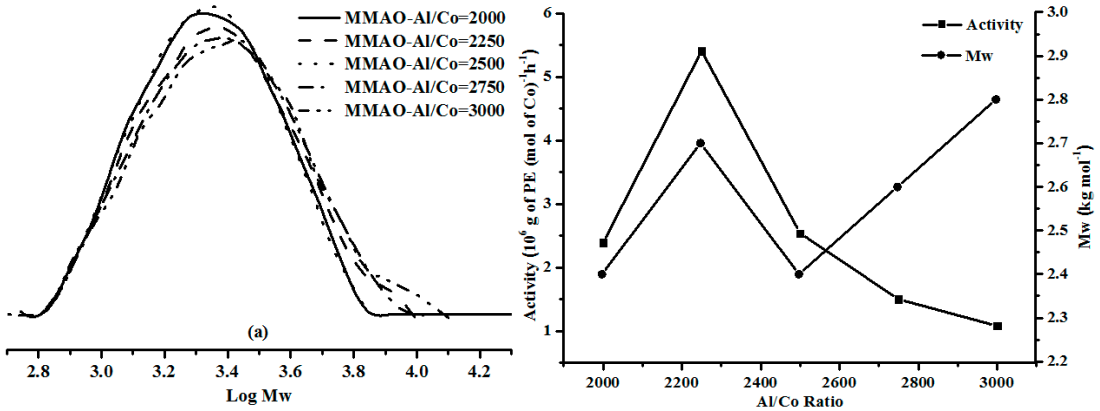

Figure S2. For **Co6**/MMAO: (**a**) GPC traces of the polymers obtained at different Al:Co molar ratios and (**b**) catalytic activity and M_w as a function of Al:Co molar ratio (entries 2, 5 – 8, Table 4).

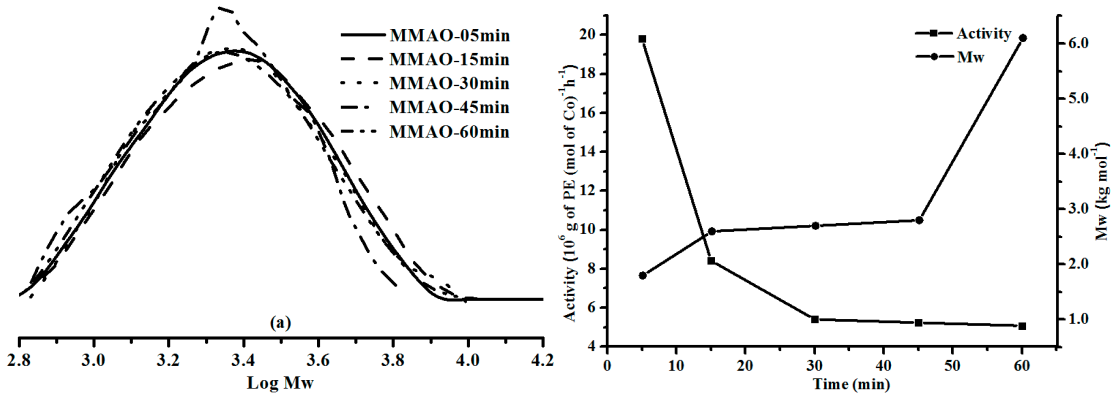

Figure S3. For **Co6**/MMAO: (**a**) GPC traces of the polyethylene obtained over the course of time and (**b**) activity and M_w as a function of reaction time (entries 5, 9 – 12, Table 4).

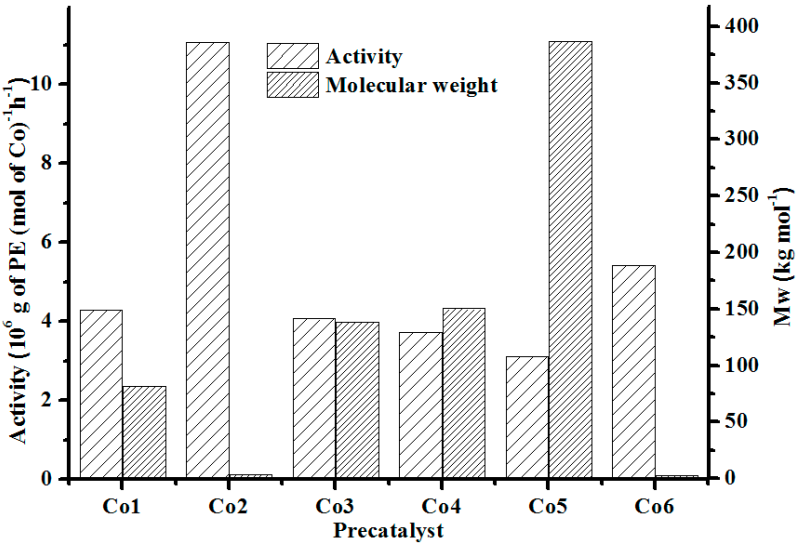

Figure S4. Catalytic activities and molecular weight of the polyethylenes produced by **Co1** – **Co6**; MMAO as co-catalyst in each case (entries 1 – 6, Table 5).

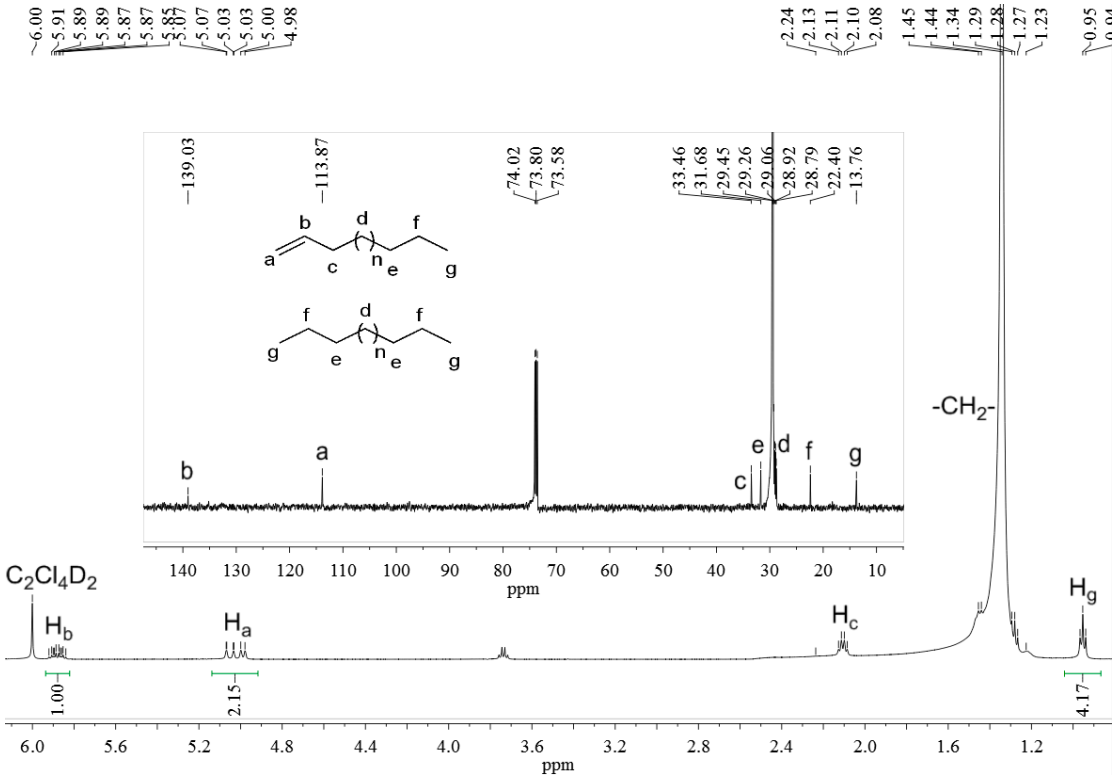

Figure S5. ^{1}H NMR spectrum of the polyethylene obtained using **Co2**/MMAO at 40 °C (entry 2, Table 5) along with an inset of the ^{13}C NMR spectrum; both spectra recorded at 100 °C in 1,1,2,2-tetrachloroethane-*d*$_2$.

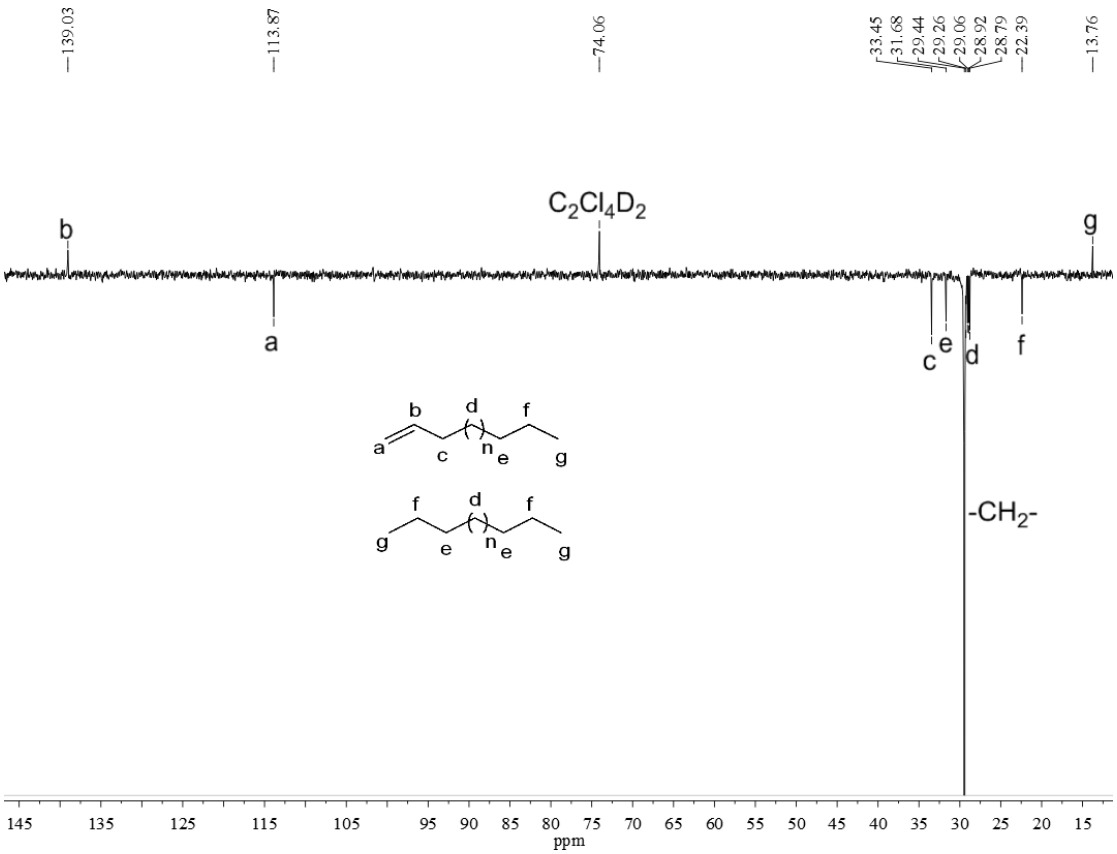

Figure S6. DEPT-135 ^{13}C NMR spectrum of the polyethylene obtained using **Co2**/MAO at 50 °C (entry 2, Table 3).

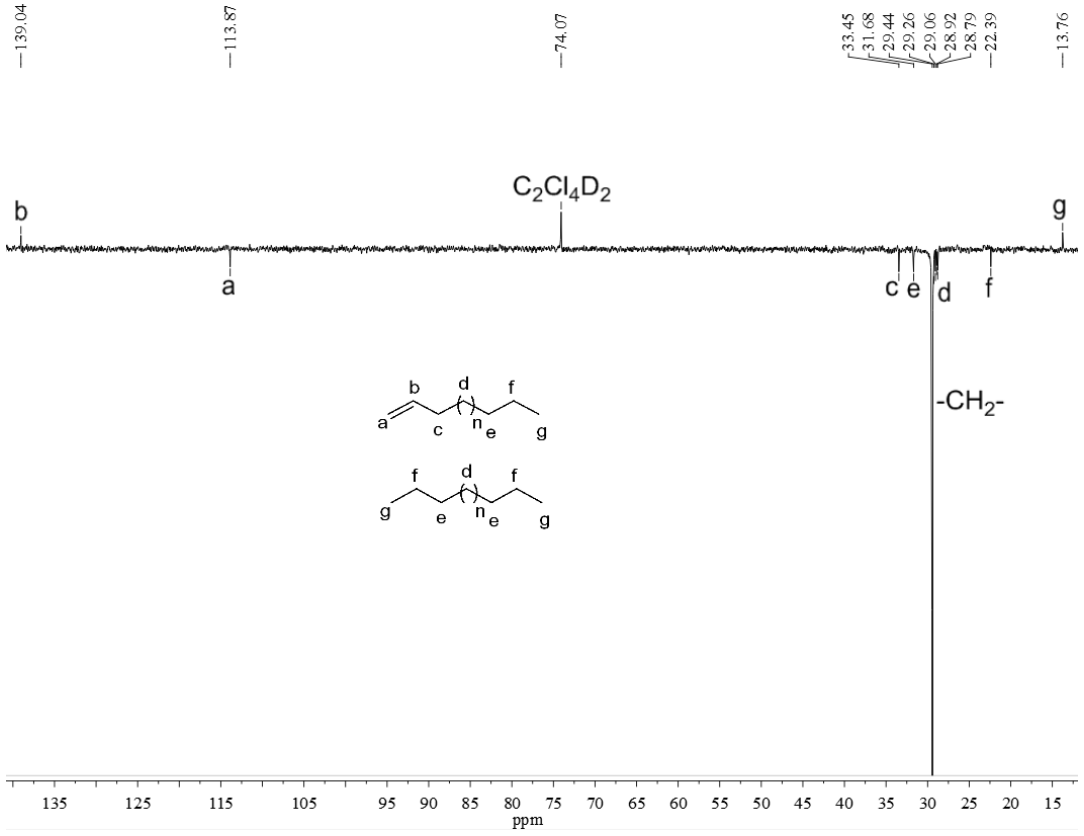

Figure S7. DEPT-135 ^{13}C NMR spectrum of the polyethylene obtained using **Co2**/MMAO at 40 °C (entry 2, Table 5).

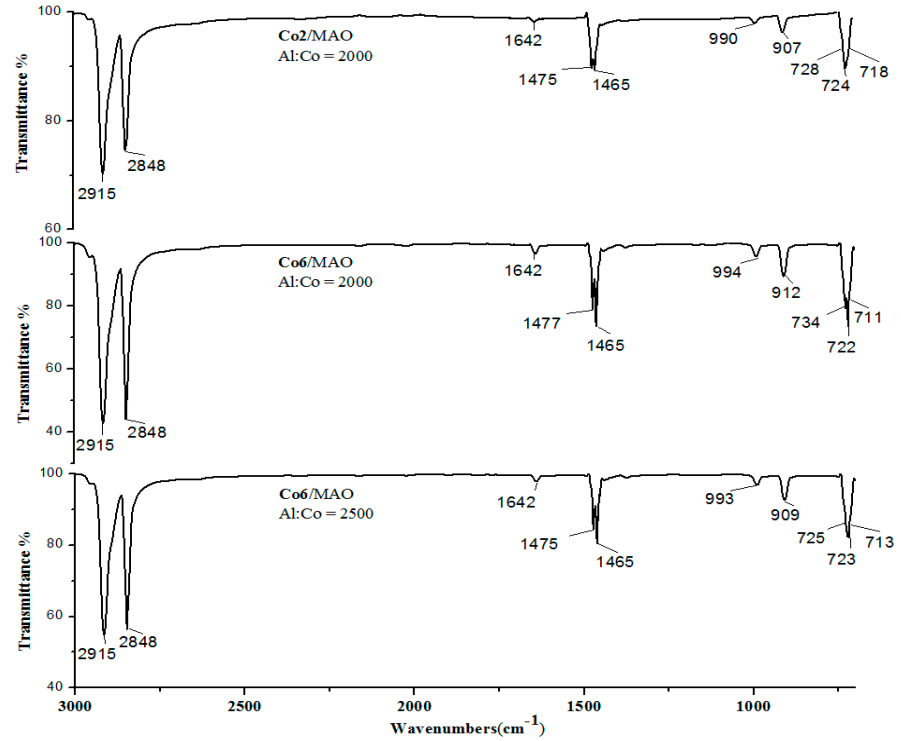

Figure S8. FT-IR spectra of the polyethylene samples generated using **Co2**/MAO (top, entry 2, Table 3) and **Co6**/MAO (middle, entry 2, Table 2 and bottom, entry 8, Table 2).

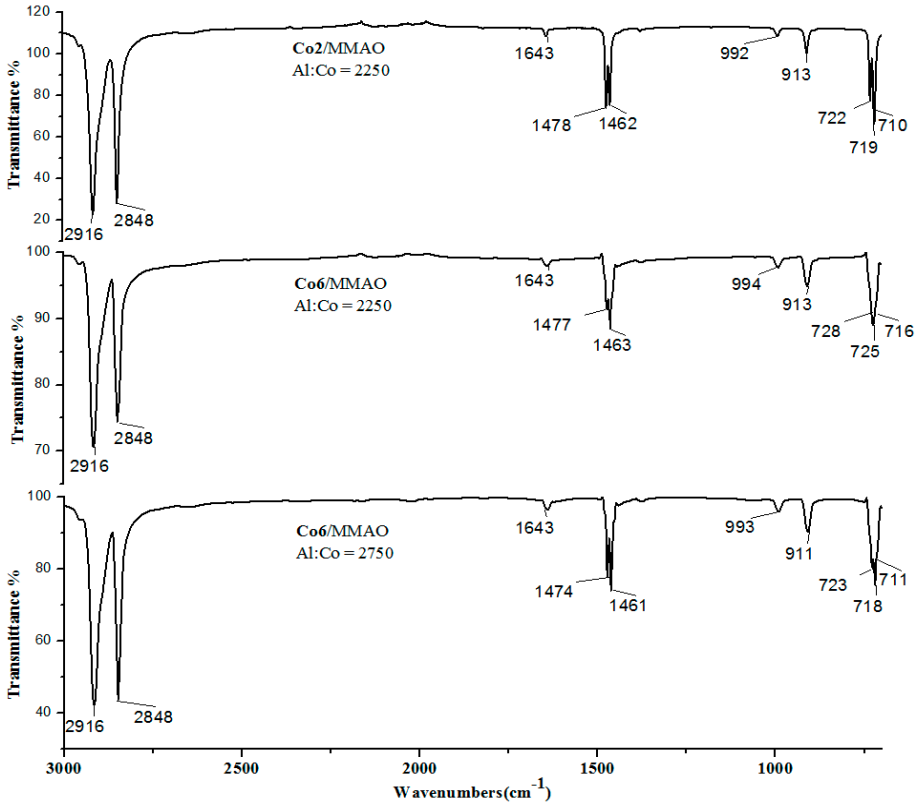

Figure S9. FT-IR spectra of the polyethylene generated using **Co2**/MMAO (top, entry 2, Table 5) and **Co6**/MMAO (middle, entry 5, Table 4 and bottom, entry 7, Table 4).